

Assignment 1

Team number: 2

Team members

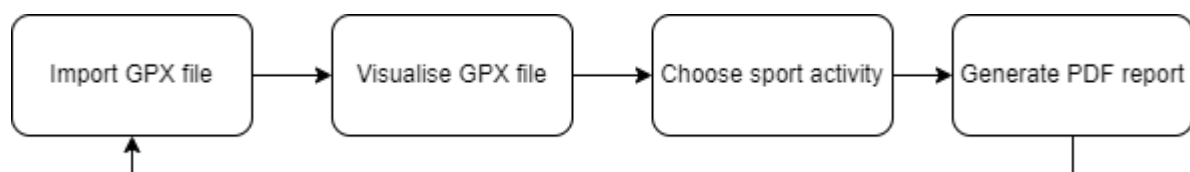
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Introduction

Author(s): Khagan Mammadov, Lucas Ponticelli, Jeroen Klaver, David Breitling

The goal of GPXManager is to visualise and process sport activities exported in the GPX format from sport tracking applications, such as Strava and RunKeeper. Given a GPX file, GPXManager generates a detailed report by computing metrics, such as distance and calories burned, while taking into account factors such as elevation and user biometrics. GPXManager provides users with a concise and easy-to-use interface and provides developers with a modular framework that allows them to extend the selection of sport activities.

A simple flowchart showcasing the usage of the application can be seen below:



Optionally, users can input their biometric data at any point during the flow of the application to improve the accuracy of the generated report.

Main types of users

- Athlete: professional or amateur athletes that regularly practise sport activities, such as hiking, running and football. The range of users practising sports is not limited, as the selection of sport activities on our application is extensible.
- Calorie conscious people: people that actively track their calorie intake and calories burned during sport activities to maintain or achieve a certain weight.

Main modules

- UI: The interface that the user will interact with. There will be a GUI to visualise different aspects of the system to ensure a concise and convenient experience for the end user.
- Activities: There will be a separate class for sport activities that encompasses the different sports and activities the user would like to track using the tool. Due to the modularity of our system this will be easy to extend with new activities.
- GPX: The module that handles and reads GPX files which will then be utilised in the rest of the system.

Extensions

The system shall be modular with regards to the specific sport activities performed by the user. Developers should be able to add new sport activities to the system by extending the abstract `Sports` class. This modularity will make the system easily extensible with additional types of sport activities and allow new metrics to be computed.

Features

Author(s): Lucas Ponticelli, Jeroen Klaver, Khagan Mammadov

Functional features

We looked at the basic requirements our system must fulfil to function. This included the capability to handle files in the GPX format, as well as the ability for the user to assign a specific sport activity to the visualised GPX file. The information provided by the GPX file and the assigned sport activity then allows the tool to compute the relevant metrics and display this information to the user. We decided upon a GUI rather than a CLI to make it more convenient for the average user to navigate the tool.

We added the ability for the user to input their biometrics as a requirement as it would give the user a much more accurate estimate of the calories they burned throughout the duration of their sport activity. However, we decided to make this feature optional, at the cost of significantly less accurate metrics, to avoid inconveniencing users concerned about the privacy of their data. As a bonus feature, we added the option to generate a printable PDF report of the summarised metrics as a means for the user to record their progress.

ID	Short name	Description	Champion(s)
F1a	Import	The tool shall be able to import a GPX file.	Lucas Ponticelli
F1b	Visualise	The tool shall be able to visualise the imported GPX file.	Jeroen Klaver
F2	Sport Activity	The tool shall be able to assign a sport activity to a visualised GPX file.	Khagan Mammadov
F3	GUI	<p>The user should be able to interact with the tool through the use of graphical widgets that serve the following functions:</p> <ul style="list-style-type: none"> • Upload a .gpx file • Select an sport activity from a list • User biometrics input menu, metrics specified in F5 • Show report with summarised data from the computed metrics in F4 	David Breitling
F4	Compute metrics	<p>The tool shall be able to compute metrics based on the imported GPX file, such as:</p> <ul style="list-style-type: none"> • Distance • Speed • Time • Elevation • Calories burned 	Lucas Ponticelli
F5	Set user data	<p>The tool shall allow the user to set personal data, such as:</p> <ul style="list-style-type: none"> • Weight • Height • Sex • Age <p>and consider them when computing metrics.</p>	Jeroen Klaver

F6B	Report	Bonus: The tool should be able to generate a printable report that visualises and summaries in a nice way the map and the computed metrics.	Khagan Mammadov, David Breitling
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Quality requirements

As the tool is centred around handling GPX files, we limited the file formats accepted as input to GPX only. To include as many sport activities as possible, we chose to write modular and extensible code that allows for the seamless addition of new sport activities by developers. As we use an external library, GMapsFX, to visualise inputted GPX files, we chose to ensure good running times by limiting the size of inputted GPX files to 1MB, as we are unaware of the performance of the external library when visualising large GPX files. To ensure a snappy user experience, we chose to calculate sport activity metrics as swiftly as possible. As our main types of users will be athletes and calorie conscious people, we expect them to use our application regularly and record their sport activities. We chose to limit the size of the generated PDF reports to 1MB to ensure that such regular usage of the application does not use up too much storage.

ID	Short name	Quality attribute	Description
QR1	File verification	Reliability	The tool shall verify if the inputted file is of the GPX format.
QR2	Extensible sport activities	Maintainability	The tool shall be conveniently extensible in terms of sport activities.
QR3	Instantaneous results	Performance	The tool should be able to calculate the metrics within 1 seconds once the user selects a sport activity.
QR4	GPX file size limit	Performance	The tool should be able to reject GPX files larger than 1MB.
QR5	PDF file size limit	Efficiency	The tool should be able to generate PDF summaries no larger than 1MB.

Java libraries

Author(s): David Breitling, Khagan Mammadov

GMapsFX

Used for visualising a GPX file. This library was recommended in the project guide.

JavaFX

Used for creating the GUI of our application and providing the framework for GMapsFX visualisation. We chose this as our GUI library because GMapsFX requires it and it is widely used with many resources available online.

JFoenix

Used for styling the user interface of the system. We chose this library because it allows us to beautify our UI using proven design choices (Google Material Design). We will use it given that it facilitates an improvement and that we have the time and resources.

Apache PDFBox

Used for generating the printable report. We chose this library because it allows us to easily create PDFs, which is a suitable format for printable reports.

Time logs

Team number	2		
Member	Activity	Week number	Hours
David Breitling	GitHub repo and Google Docs setup	1	1
Everyone	Team meeting	1	4
Jeroen Klaver	Functional features	1	2
Lucas Ponticelli	Functional features	1	2
David Breitling	Java libraries	1	2
Khagan Mammadov	Java libraries	1	2
Everyone	Team meeting	2	4
David Breitling	Extensions	2	1
Everyone	Team meeting	2	4
Jeroen Klaver	Main modules	2	1
Lucas Ponticelli	Main types of users	2	2
Khagan Mammadov	Overall idea about how it works	2	2
Khagan Mammadov	Quality requirements	2	1
Jeroen Klaver	Finishing touches	2	2
Lucas Ponticelli	Finishing touches	2	2
Khagan Mammadov	Finishing touches	2	4
		TOTAL	18